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Pacific about 30 miles to the westward of the former place. Between this point and the Gulf of St. Blas the Atlantic and the Pacific approach nearer to each other than they do in any other part, and the object of the paper was to call attention to the fact that, during the many surveys which had been undertaken with a view to discover the most practicable line for a ship-canal, this part had been neglected. The neck of land which divides the Atlantic from that point on the Bayanos River to which the tide of the Pacific extends, is only 15 miles across; and, however incredible it might seem, this short distance had never been crossed, much less explored, by a white man. In 1837 Mr. Wheelwright attempted it, but was driven back by the Indians; and some years later Mr. Evan Hopkins started with a view of exploring this route, but was compelled to abandon it for the same reason. The object of the writer in his visit was simply a reconnaissance, the persons in whose company he made the trip having no idea of exploration, but merely of visiting the little settlement of Chepo, where they had bought an estate. He was unable to reach so far as Terable, where the influence of the Pacific tides ends, and where an expedition to cross to the Atlantic would have to start from; but he saw from Chepo a very remarkable depression in the mountain chain about 10 miles distant. He was repeatedly assured, both at Panama and at Chepo, that the Darien Indians were in the habit of hauling their canoes on wooden slides across the Cordillera, from the Mandinga River, and launching them in the Bayanos. Surely it was a discredit to the civilization of the nineteenth century that the Indians should be said to pass with boats from the Pacific to the Atlantic, and that we should never have had the curiosity to verify this fact, or explore the only section of the Isthmus of which it could be stated with any appearance of truth.

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The second Paper was the following :—

2. *A Journey from Chimborazo to Bogotá, across the Central Andes.*

By ROBERT CROSS, Esq.

THE Paper was a narrative of a journey performed by the writer while employed by the India Office in collecting seeds of the Pitayo cinchona-tree for planting in India. This valuable species of cinchona appears to be now reduced to a few specimens growing near Popayan, from which the writer succeeded in obtaining a good supply of seeds. He was residing in the neighbourhood of

Chimborazo, when the orders reached him from England to proceed on his journey. From this place he travelled along the Cordillera, by way of Quito, Ibarra, Pasto, and Popayan, to the Chinchona district in the wooded valley of Sylvia, where the station Pitayo is situated. One day's journey to the southward of Sylvia, in a deep valley, lies the village of Totoro, and about six hours' journey to the south of Totoro, at the base of a forest-covered slope, from the crest of which rises the snow-covered volcano of Puracé, is the Indian village of the same name. The author explored the forest to the east of Sylvia, and ascended the *Piñon de Pitayo*, which he ascertained by boiling-point to have an elevation a little over 8000 feet. The Indians of Pitayo speak the *Paéz* language, which is quite distinct from the *Quichua*, of the Indians of Ecuador, Peru, and Bolivia; and, what appears more strange, it is said to have no relation whatever to the language *Guambiana*, which is spoken by the adjacent Indians of Sylvia, Totoro, Paniquita, and Puracé. His journey from the Pitayo forests to the valley of the Magdalena was over the high and bleak plateau of Guanacas, where his mules had a narrow escape of perishing of cold, and where he saw the road strewn with skeletons of men and animals.

Grand-General MOSQUERA (Minister of the United States of Columbia to Great Britain) addressed a few remarks to the Meeting, at the invitation of the President. He said he knew well the country which Mr. Oliphant had described in the paper just read, and appreciated the importance of an accurate survey being made. His Government were now about to undertake this with a view to opening roads across the Isthmus of Darien, and thus, by increasing the means of communication, promote the growing trade between Columbia and England. Another great undertaking was the Buenaventura macadamized road which they were now constructing to the interior of the Cauca valley, the richest of the States both in tropical agricultural produce and mining.

Mr. EVAN HOPKINS said he had resided many years in New Granada, superintending gold and silver mines. On his return home in 1847, he was employed by General Mosquera, then President of New Granada, to survey various routes across the isthmus. In his first journey he crossed the isthmus from Chagres to Panama; subsequently he crossed from Panama to Portobello; he then came back, and re-crossed at another part: and afterwards went to the river Bayanos, and made a survey of it. Mr. Oliphant's description of that river from the mouth to the bend, near Fort Terable, agreed with his own report to the Government. It is a splendid river. The tide extends nearly a mile beyond Fort Terable. Mr. Oliphant had correctly described the obstacles that exist against the passage of the Darien mountains to the Atlantic: he was not able himself to cross from the Bayanos River to Mandinga Bay on account of the Indians. However, he was able to go far enough to make observations to prove that the physical obstacles between the river Bayanos and the gulf of S. Blas were much greater than between Chagres and Panama. The ridge spoken of appeared to him to be from 2000 to 2500 feet high, he could see no depressions in it to render eligible for making a suitable communication between the Atlantic and Pacific in this direction. If a ship-canal were wanted, there could be no doubt that the very best route for it was where the Panama Railway now is,

for there the highest elevation is only 250 feet. The ground between the head of the Rio Grande and the Chagres is the lowest and narrowest between the two Americas. He considered that this settled the whole question, and that a ship-canal, or rather an absolute connection of the two seas by means of a strait, could be constructed there if the capital were forthcoming. He projected the Panama Railway, and estimated the cost at 800,000*l*. He estimated the cost of connecting the two seas by means of a strait at 10,000,000*l*. With regard to the Andes, the difficult passage of which had been described by the author of the second paper, he could well imagine a stranger, unprovided with proper means, meeting with difficulties. He had himself crossed the Andes five times, and met with no great difficulty.

Mr. GERSTENBERG said a ship-canal, the cost of which might be calculated at twelve millions sterling, could not be made without a good harbour existing at each end. The circumstance that there was a sandbank at the mouth of the Chepo or Bayanos extending over three miles, with a depth of only eight feet at low water, and a rise of tide of sixteen feet, put that route out of the question. It was utterly inadequate for an interoceanic canal, that aspired to transmit the fleets of two hemispheres, and should necessarily offer the most perfect shelter and accommodation. The same objection applied to the Panama and Chagres route, which but for that would have been made into a canal long since. At Panama vessels must remain several miles from the shore, while at Chagres it was positively dangerous for vessels to anchor. The only route that he believed to be practicable is the projected Darien canal route, across the neck of land from Caledonian Bay to the Gulf of St. Miguel. In 1854 an international expedition was sent to the Gulf of St. Miguel, with a view to survey the isthmus in this part. As Humboldt said, Nature had, in this deep indentation of the land, showed us the way to penetrate the isthmus. The highest elevation is 930 feet; but it had been stated, by Dr. Cullen and Commander Parsons and others, that west of this part there is a transverse valley running from the main ridge to Caledonian Bay. In this instance there were two excellent harbours for the termini of the canal: Caledonian Bay on one side, and the head of the Gulf of St. Miguel on the other. The only point to be settled was the existence of this transverse valley, which subsequent explorers had failed to find, because they did not wish to find it, owing, as he believed, to the jealousy of the Panama Railway Company and of the concessionaires of the Atrato route, who had rival interests, and consequently did not desire that the transverse valley should be found. Should this statement be incorrect, he hoped General Mosquera would put the Meeting right on the subject. The tide in the Pacific reaches through the Gulf of San Miguel up the River Savana, which is navigable for the largest vessels. At the confluence of the River Lara with the Savana it has still a rise of 12 feet. From this point to Caledonian Bay, a distance of 35 miles, the projected ship-canal would have to be constructed. The real difficulty consists in an elevated portion, 3 miles in length, through which in the worst case a tunnel would have to be made. But there is good reason to suppose the transverse valley observed by Commander Parsons a little north of the Agla, would render this unnecessary. In the Hydrographic Map of Parson's Survey of Caledonia Bay, he gives several views of the Cordillera; and View No. 3 clearly shows that the Cordillera at that point is not an uninterrupted chain, but is broken into two separate and distinct mountain ridges, where a transverse valley may naturally be expected. It was highly desirable that further explorations of that locality should be undertaken; and, considering the immense importance of opening a ship-canal through the isthmus, and the great good which would thereby be conferred on humanity, he held it to be a legitimate object of the Royal Geographical Society to endeavour to bring about so desirable a result.

Mr. OLIPHANT said he had avoided alluding to the St. Miguel route, because the valley which Mr. Gerstenberg had referred to, had given rise to great differences of opinion as to whether it really existed or not. The only object of his paper was to point out the extraordinary circumstance that that part of the isthmus where the two oceans approached each other within 15 miles had never been explored by anybody. With reference to Mr. Gerstenberg's opinion that harbours at each end were of more importance than a depression in the ridge, he would appeal to any engineer whether it is not much easier to make a harbour than to tunnel through thousands of feet of a ridge, by which sailing-ships might pass. It so happened that at the mouth of the Chepo there are 24 feet of water, and he could not conceive why that should be called a bad harbour; particularly as there was at the mouth of that river an island to shelter the ships until the rise of the tide enabled them to cross the bar. There was also a perfect harbour on the other side, the Bay of Mandinga. He thought the interests of the British public would be very much served by having that route examined.

Mr. CRAWFURD said in his opinion the interests of the British public would be better served by adopting neither one route nor the other. No ship-canal, that he was aware of, had ever paid its expenses, and he believed no ship-canal ever would. The great obstacle to a ship-canal across the isthmus of Panama was the existence of the Panama Railway, which diminished, of course, the necessity for any other mode of communication. They had been told by one gentleman that the cost would be 12,000,000%; that would be 12,000,000% of British money, for there is no other people that would be at the expense.

Dr. HODGKIN thought there could be no question that it was really desirable to consider the capabilities of the various routes across the isthmus, whether by railroads, or by minor canals, or by canals which ships could pass through. But another route had been proposed by Emanuel Cardenas, a person who perished in a ship which was burned at sea. He took a lively interest in the aborigines of his own country, and on one occasion told him that the Indians in that part were not so fierce and wild as those who had successfully prevented our countrymen crossing by the Chepo route. It had been proposed by Mr. Oliphant that an armed force should accompany the exploring party and fight their way across. He was much disposed to think that the difficulty was to be overcome by conciliating and civilising the Indians in the first instance. With respect to Cardenas's route, his idea was that there was a passage opening a little to the eastward of the isthmus, which communicated sufficiently near to the western coast to make that a desirable route.

Mr. MARKHAM: That is the Atrato route.

The PRESIDENT said the subject of a ship-canal across the isthmus of Panama had been productive of numerous discussions in the rooms of the Society. Mr. Crawford protested against any of these expeditions; but for his own part, in presiding there, he must say that it was a disgrace to British geographers, to British men of science, and to the British nation generally, that we had not made ourselves better acquainted with that region. It was one of the great *desiderata* which they had still to accomplish before the objects of the Geographical Society were attained. He hoped the subject would be revived at some future time, and that General Mosquera would be able to induce some of his own countrymen to carry out the expedition, or, with the great power he possesses, to aid us in the work.

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